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(54) Method and apparatus for monitoring and maintaining concentrate material in a fluid carrier.

(57) A system that monitors and maintains the concentration of material in a fluid carrier which includes means (22) for circulating the fluid carrier within a substantially closed loop system (12) and means (34) for measuring the concentration of material carried in the fluid. The measuring means includes means (40, 55, 59) to detect rapid changes in transmissivity of the fluid carrier, which are indicative of the presence of entrained air bubbles in the fluid carrier, so that measurements of material concentrate under such conditions may be ignored or rejected. Further to ensure that an accurate measurement of concentrated material depletion is being observed, more than one consecutive transmissivity measurement is made and validated before concentrate is finally added to the fluid carrier in the system. In the preferred embodiment, the determination of whether air bubbles may be entrained in the fluid carrier is accomplished by determining a disparity between two consecutively measured samples to have been greater than a predetermined value. If such a disparity exists, the measurement sampling rate is increased until the disparity between consecutively measured samples is again less than the predetermined value, at which time sampling is again performed at slower sampling rate. If a disparity exists between several consecutive samples and the disparity in
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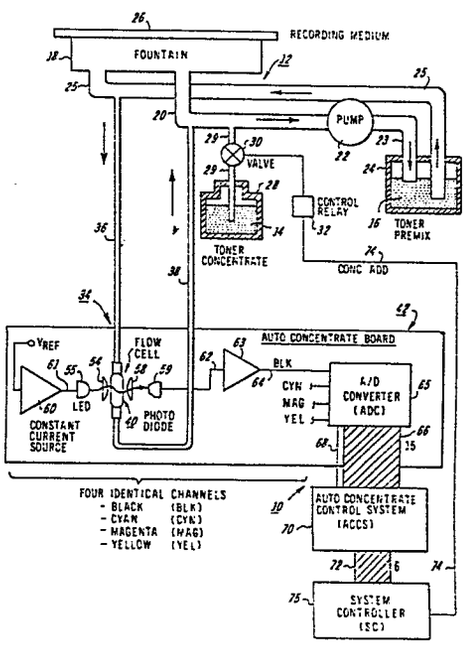

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each case remains below the predetermined value, the samples so observed are determined as valid and representative of continuous depletion of the concentrate material in the fluid carrier. When several of these consecutive and validated sample values of transmissivity exceeds a predetermined threshold and there has been no interruption in such sampling due to a disparity between samples greater than the predetermined value, an enablement will be provided to permit concentrate material to be added to the fluid carrier. The system of this invention has particular application to monitoring the level of toner concentrate in the fluid carrier of a fluid toner development system in an electrographic printer/plotter.

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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
D,Y	US-A-4 222 497 (LLOYD et al.) * abstract; column 7, line 41 - column 9, line 46; figures 6, 7 *	1,4	G 03 G 15/10 G 05 D 21/02 G 05 D 11/13
Y	DE-B-2 328 636 (TECHNICON INSTRUMENTS) * column 3, lines 21-27; column 3, lines 36-67; column 4, line 45 - column 7, line 50; column 8, lines 36-40; figures 1A, 1B *	1,4	
A		5,7,9	
A	DE-A-2 542 231 (CANON) * page 8, lines 8-19; page 9, lines 7-18; page 14, line 21 - page 15, line 11; page 22, line 23 - page 27, line 24; page 30, lines 14-21; figures 6, 10, 11 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4) G 03 G 15/00 G 01 N 21/00 G 01 N 35/00 G 05 D 21/00
A	US-A-4 054 384 (HAWES) * abstract; column 4, lines 23-50; column 6, line 66 - column 7, line 38; column 7, line 65 - column 9, line 30; figures 1, 2, 6 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	22-01-1987	BEITNER M.J.J.B.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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